16V, 250 A Low Power, Low Noise Dual Precision CMOS Rail-to-Rail Output Operational Amplifiers

Preliminary Technical Data

AD8667

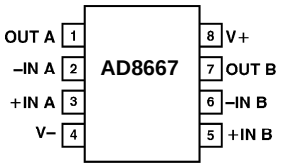
FEATURES
Lower Power at High voltage: 250 μA typ
Low Offset Voltage: 100 μV
Voltage Noise: 20 nV/√Hz
Low Input Bias Currents 1pA Max

Single-Supply Operation: 5 to 16 Volts
Dual-Supply Operation: +/- 2.5 to +/-8 Volts
Output drive: 10mA
Unity Gain Stable

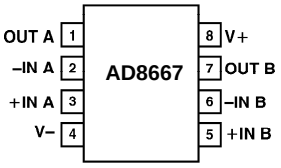
APPLICATIONS
Medical Equipment
Physiological Measurement
Precision References
Buffer / Level Shifting
Portable Operated Systems
High density Power Budget Systems
Multi-pole Filters
Sensors
Photodiode amplification
ADC driver

PIN CONFIGURATIONS

8-Lead MSOP
(RM-8)



8-Lead SO
(R-8)



GENERAL DESCRIPTION

The AD8667 is a dual rail-to-rail output single supply and dual supply amplifiers that use Analog Devices' patented DigiTrim® trimming technique to achieve low offset voltage, 300μV over the common mode range. The AD8667 family features an extended operating range with supply voltages up to 16 V for low power operation with I_{SY} of < 325 μA over the extended industrial temperature. These devices are designed for low noise at higher voltages, 20 nV/√Hz at 10 kHz and 23 nV/√Hz at 1 kHz. They also feature low input bias currents of 1pA and 10mA output drive.

The combination of low supply currents, low offsets, very low input bias currents, and wide supply range make these amplifiers useful in a wide variety of low power applications.

Systems utilizing DC to low frequency measurements, or high impedance sensors, such as photo-diodes benefit from the combination of low input bias current, low noise, low offset and drive current. The wide operating voltage range matches today's high performance ADCs and DACs. Medical monitoring equipment can take advantage of the low voltage noise, high input impedance, low voltage and current noise,.

The AD8667 is specified over the extended industrial (-40° to +125°C) temperature range.

REV. PrA

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ELECTRICAL CHARACTERISTICS

(V_S=+5.0V, V_{CM} = V_S/2, T_A=+25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	V_{SY} = 8V, V_{CM} = 3V			100	µV
		V_{CM} = - 0.1V to 3.0V		30	300	µV
		-40°< T_A < +85°C			650	µV
		-40°< T_A < +125°C			750	µV
Input Bias Current	I_B			0.3	1	pA
		-40°< T_A < +85°C			50	pA
		-40°< T_A < +125°C			300	pA
Input Offset Current	I_{OS}			0.2		pA
		-40°< T_A < +85°C			20	pA
		-40°< T_A < +125°C			75	pA
Input Voltage Range	IVR		-0.1		3	V
Common-Mode Rejection Ratio	CMRR	V_{CM} = -0.1V to 3.0V	80	95		dB
Large Signal Voltage Gain	A_{VO}	R_L = 2 kΩ V_O= 0.5V to 4.5V	70	85		V/mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$			4		µV/°C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	I_L = 1mA		4.8		V
		-40°C < T_A < +125°C	4.6			V
Output Voltage Low	V_{OL}	I_L = 1mA		200		mV
		-40°C < T_A < +125°C			250	mV
Short Circuit Current	I_{SC}			±5		mA
Closed Loop Output Impedance	Z_{OUT}	f=100kHz, A_V = 1		100		Ω
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	V_S = 5 V to 16 V	80	95		dB
Supply Current/Amplifier	I_{SY}	V_O = 0V		250		µA
		-40°< T_A < +125°C		325		µA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L =2 kΩ		0.2		V/µs
Settling Time	t_S	To 0.1%, 0 V to 1V step				µs
Gain Bandwidth Product	GBP			550		kHz
Phase Margin	Øo			60		degrees
NOISE PERFORMANCE						
Peak-to-Peak Noise	e_n p-p	f=0.1Hz to 10 Hz		3.5		µV p-p
Voltage Noise Density	e_n	f=10kHz		20		nV/√Hz
Voltage Noise Density	e_n	f=1kHz		23		nV/√Hz
Current Noise Density	i_n	f=1kHz				pA/√Hz

ELECTRICAL CHARACTERISTICS

(V_S=16V, V_{CM} = V_S/2, T_A=+25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	V_{SY} = 8V, V_{CM} = 3V			100	µV
		V_{CM} = -0.1V to +14.0V		30	300	µV
		-40°< T_A < +85°C			650	µV
		-40°< T_A < +125°C			750	µV
Input Bias Current	I_B			0.3	1	pA
		-40°< T_A < +85°C			50	pA
		-40°< T_A < +125°C			300	pA
Input Offset Current	I_{OS}			0.2		pA
		-40°< T_A < +85°C			20	pA
		-40°< T_A < +125°C			75	pA
Input Voltage Range	IVR		-0.1		14	V
Common-Mode Rejection Ratio	CMRR	V_{CM} = -0.1V to +14.0V	80	95		dB
Large Signal Voltage Gain	A_{VO}	R_L=2 kΩ V_O= 0.5V to+15.5V	70	85		V/mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$			3		µV/°C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	I_L = 1mA	15.8	15.9		V
		I_L = 10mA	15	15.2		V
		-40°C < T_A < +125°C	14.7			V
Output Voltage Low	V_{OL}	I_L = 1mA		51	80	mV
		I_L = 10mA		550		mV
		-40°C < T_A < +125°C		900		mV
Short Circuit Current	I_{SC}			±10		mA
Closed Loop Output Impedance	Z_{OUT}	f=100 kHz, A_V = 1		100		Ω
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	V_S = 5V to 16V	80	95		dB
Supply Current/Amplifier	I_{SY}	V_O = 0V		250		µA
		-40°< T_A < +125°C		325		µA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L =2 kΩ		0.3		V/µs
Settling Time	t_S	To 0.1%, 0 V to 1V step				µs
Gain Bandwidth Product	GBP			550		kHz
Phase Margin	Øo			60		degrees
NOISE PERFORMANCE						
Peak-to-Peak Noise	e_n p-p	f=0.1Hz to 10 Hz		3.5		µV p-p
Voltage Noise Density	e_n	f=1kHz		23		nV/√Hz
Voltage Noise Density	e_n	f=10kHz		20		nV/√Hz
Current Noise Density	in	f=1kHz				pA/√Hz

Notes